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July 17

CALIFORNIA STATE DEPARTMENT OF PUBLIC HEALTH
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Weekly Bulletin

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Entered as second-class matter February 21, 1922, at the post office at Sacramento, California, under the Act of August 24, 1912. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917.

Vol. XII, No. 23
July 8, 1933
GUY P. JONES
EDITOR

*Childhood Tuberculosis Roentgenologically Considered**

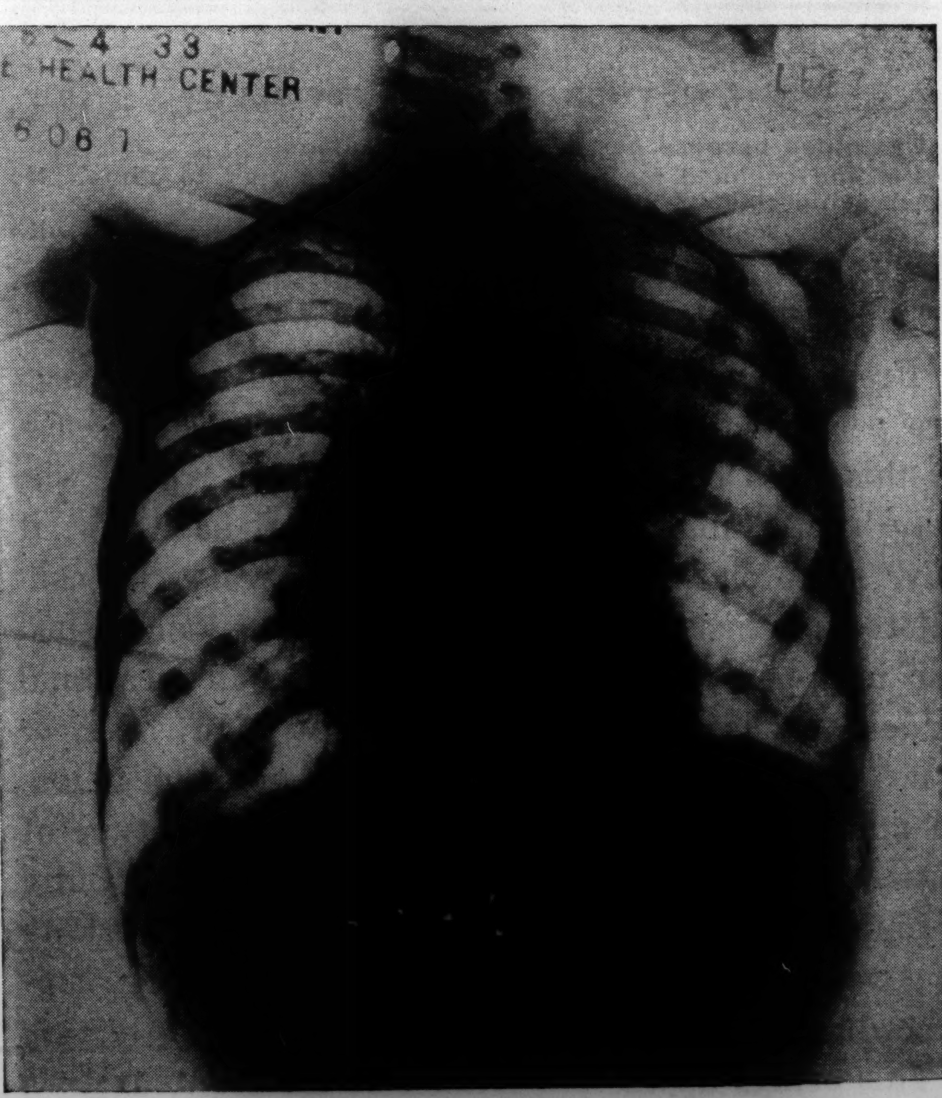
By Merl Lee Pindell, M.D., Los Angeles

I shall review briefly some of the work that has been done in the X-ray section of the Los Angeles County Health Department during the past five years. In cooperation with the Los Angeles County Tuberculosis and Health Association, we have directed our efforts chiefly towards discovering tuberculosis in its early stages, particularly in children.

This paper will be confined to the general impression of 375 cases of pulmonary tuberculosis, and 1176 cases of glandular and calcified tuberculous lesions in children. These cases represent 4½ per cent of the total number of children's chests X-rayed, which is 6747. Their ages range from infancy to 15 years. Most of these children in this study have been followed from 1 to 5 years. They received their Roentgen examination on account of symptoms or signs of the disease, or because of known contact to an open case of pulmonary tuberculosis. Practically all children had a positive tuberculin reaction before an X-ray was taken. The Mexican race comprises quite a high percentage of the children in this series.

In theory, if all adults, who have pulmonary tuberculosis, were isolated, we would have no tuberculosis in children. Therefore, in our campaign against tuberculosis we must constantly examine adults, as the possible source of infection.

MOTHER AND TWO CHILDREN, SHOWN TO ILLUSTRATE THE MAXIM—TUBERCULOSIS CAUSES TUBERCULOSIS



6067, MALE, AGE TWO AND ONE-HALF YEARS

First seen in the clinic May 4th. In good health until he had measles, one month previous to visit to clinic. Was convalescing from chickenpox when examined. Physical examination was not very satisfactory, as the child cried constantly.

Died of tuberculous meningitis May 18th.

Roentgen impression: Tuberculous bronchopneumonia in the left upper lobe, and miliary deposits over the lower left lobe and upper half of the right lung.

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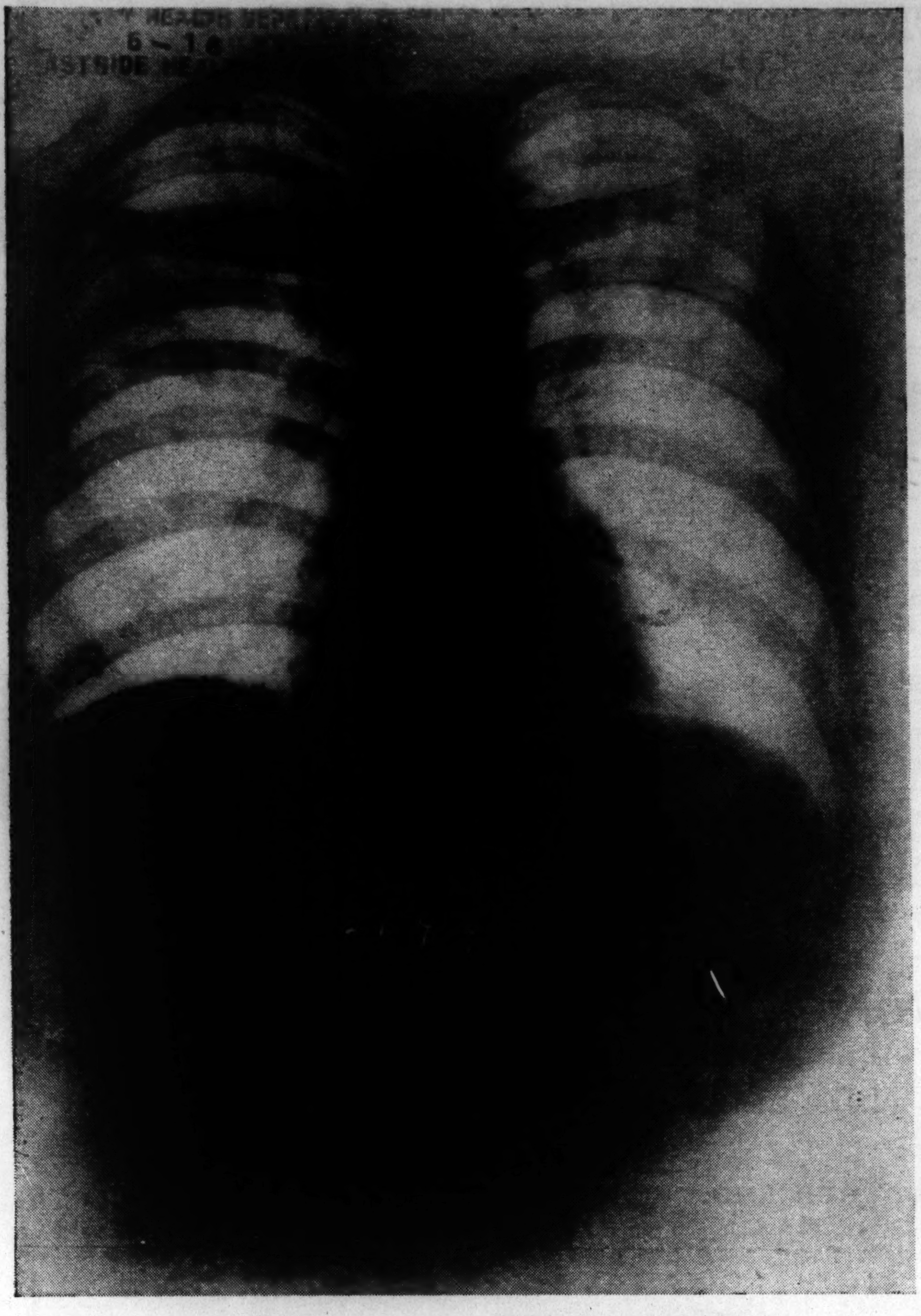
* Read at the Fourth Annual Meeting of the Western Branch of the American Public Health Association, Pasadena, May 31, 1933.



6144, MOTHER, AGE TWENTY-SEVEN

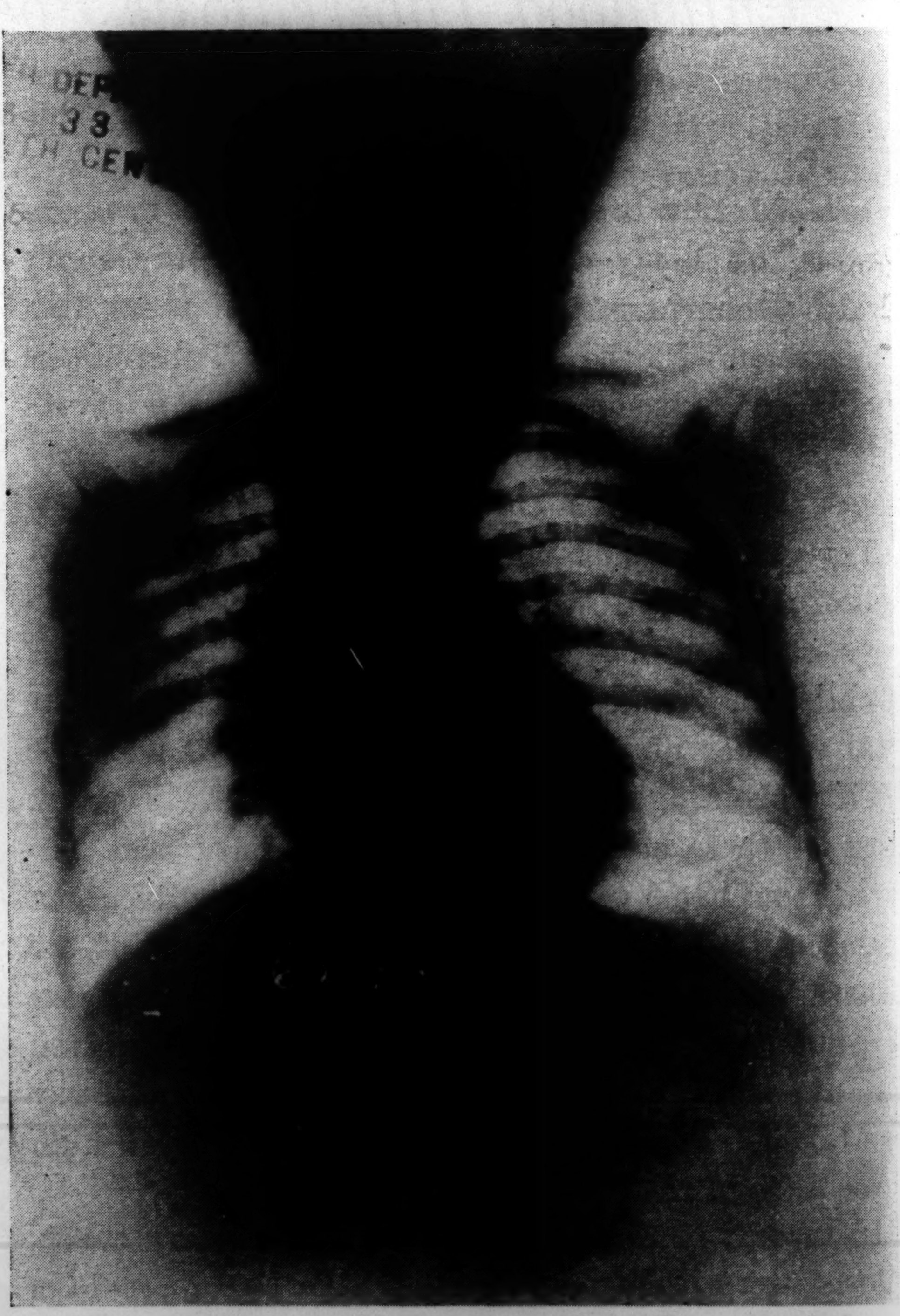
Examined because her son was tuberculous.
She had coughed for five days previous to visit to clinic. No other symptoms.
Probable source of infection—adult cousin, who lived with family for ten days, and died of tuberculosis in March, 1933.
Roentgen impression: Moderately advanced bilateral pulmonary tuberculosis.

From a public health standpoint, the fibroid cases are perhaps the most dangerous type of the disease, as this class belongs to the unsuspected group, who may be working eight hours daily, and have few, if any, symptoms. A grandparent may also be considered in this category. He may be well nourished and in apparent good health, except for an occasional attack of what he terms "bronchitis." Many of these types of cases are infecting our younger generation. In many instances we are unable to get this type of patient in for examination until a child in the family is found to be tuberculous. This is probably working backwards, but unfortunately it is the only sure procedure.

This brings up the importance of the Mantoux test. This test may not be of importance in indicating disease, except in very young subjects, but it does help direct our attention to the source of infection, and is certainly of some significance in the negative phase. Theoretically speaking, when we assume that a positive Mantoux test denotes a specific reaction, we must conclude that most children who react have been or are contacts, as tuberculosis causes tuberculosis.

During the past three months one of our clinicians has collected records of eighteen different contact families, in which some of the children reacted negatively to the Mantoux test, and some reacted positively. Later on the negative reactors developed pulmonary tuberculosis, and all the positive reactors escaped the disease. Two of these negative reactors, who became infected, have since died. These findings conform closely to Geer's[1] study with nurses.

Let us now consider briefly pulmonary infection in the lungs, and its evolution in childhood. Tuberculosis in children may be due either to the bovine or the human type of bacillus. Pulmonary tuberculosis of children is almost invariably human in origin, while tuberculous infection in the abdomen is mostly due to the bovine type of bacillus. The primary lesion is more often single, and lies subpleurally. Histologi-



6145, FEMALE, AGE ONE AND ONE-HALF YEARS

Had been coughing a little since March, 1933, when she had the measles.
No physical findings in the chest.
Roentgen impression: Moderately advanced bilateral pulmonary tuberculosis, with enlarged hilar right lymph nodes.
Patient still living.

cally, the primary focus is a localized patch of tuberculous broncho-pneumonia, which has a tendency to heal, in most cases.

The lymph nodes at the hilum are the seat of a similar tuberculous lesion. The lungs are variably marked off into definite lymphatic territories, which drain into the relating tracheobronchial lymph nodes at the hilum, and these nodes have no direct connection with the lymph nodes in the neck or abdomen.

Blacklock[2] found no retrograde spread from the tuberculosis tracheobronchial lymph nodes back into the lung substance, and concluded that lymphogenous origin of the primary focus is unlikely. The lymph nodes are occasionally seen, in a good roentenogram, projecting from the hilum and peritracheal region into the lung field.

A few of these enlarged lymph nodes have been reported as rupturing into the lung, producing pulmonary tuberculosis and in one instance, neither one of these is included in our series, autopsy revealed glands so large as to produce an obstruction of the trachea, and death was apparently the result of this compression.

We have observed 112 cases of these types of lesions, and have found them to be of no great moment. All have disappeared, or partly resoluted, some, of course, leaving the characteristic areas of calcification, which we will now consider.

Assuming that the primary lesion and the secondarily infected lymph nodes have undergone calcification, as so many childhood infections do, and that strictly speaking, there is nothing in evidence in a good roentenogram but these calcified lesions, what consideration shall be given them? We will not go into detail by which these calcified areas are indentified, suffice to say that the conformation of the chest is such as to make identification of all calcified deposits in the lung and lymph nodes impossible. We know that the majority are shown on a good X-ray film and, of course, more are depicted by the use of the oblique, or lateral, film. We have used the oblique film routinely for the past three years. However, at the present time this has been eliminated for the sake of economy.

Of what importance are calcified lesions in children? Knowing that the live tubercle bacilli can be demonstrated in calcified material, and even in apparently healthy lung tissue, we might assume that an unhealed area around a calcification could be so small as to escape notice and, therefore, later cause trouble. No doubt there are many such unhealed areas that have escaped our notice, but as far as later causing trouble, it is questionable. We have encountered only two instances in which a child, who previously had a calcified lesion, later developed pulmonary tuberculosis. In both cases the patient was not removed from its infective environment.

Coryllos[3] states, "The tubercle bacillus is a strict aerobe, requiring large amounts of oxygen for continued life and growth."

I would say that calcified lesions represent a conspicuous example where oxygen is excluded. If this theory is sound, calcification is of litttle significance. However, Stewart[4] thinks that the primary infection is distinctly detrimental. He bases his conclusions on the study of 84 cases of consumption in children, taken from 10,000 children examined at Lymanhurst. He does not state, however, how many of the 10,000 that had calcified lesions and were positive reactors to the Mantoux test, escaped the disease.

Other authors state that these types of lesions represent neither special protection nor unusual hazard so far as secondary disease is concerned. Still others, just as eminent, state that these lesions are a protection.

Opie[5] says, "There is small probability that calcified nodules found in tracheobronchial lymph nodes will give rise to clinical disease."

He cites that the incidence of manifest tuberculosis has been less than 2 per cent, and in many cases the child has remained in constant contact with the source of infection.

He further states, "All we know about immunity against tuberculosis indicates that infection causes some but limited resistance to the disease."

Our own findings to date, based on 1059 cases of calcified lesions in children, indicate that strictly calcified lesions are of no great consequence in causing manifest tuberculosis.

My own opinion[6] is that they are an asset to the individual. I never view a film of a healthy child, which shows universal calcification without questioning the importance of calcification causing future trouble.

Some writers classify calcified tuberculous lesions in children as actual disease. I think calcified lesions, without any other evidence of the disease, may represent a good example of relative immunity—similar to the Mantoux test which is concomitant. However, we will probably be in a better position to judge this a few years hence.

The reason that we have devoted so much time to this phase of the work is the fact that it comprises a large percentage of the cases under observation, and is therefore important on account of follow-up. Furthermore, it is surprising how much confusion exists regarding the interpretation and the significance of these lesions.

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(Continued in next issue)

MORBIDITY *

Diphtheria

42 cases of diphtheria have been reported, as follows: Calexico 1, Los Angeles County 8, Alhambra 1, Huntington Park 1, Los Angeles 23, Colton 1, Redlands 1, San Diego 3, San Francisco 2, San Jose 1.

Chickenpox

243 cases of chickenpox have been reported. Those communities reporting ten or more cases are as follows: Berkeley 18, Oakland 29, Los Angeles County 18, Los Angeles 30, San Diego 23, San Francisco 21, San Joaquin County 16.

Measles.

561 cases of measles have been reported. Those communities reporting ten or more cases are as follows: Oakland 17, Los Angeles County 72, La Verne 13, Long Beach 14, Los Angeles 119, Pasadena 22, San Fernando 12, Santa Monica 13, Orange County 11, Santa Ana 13, Needles 103, San Diego 21.

Scarlet Fever

84 cases of scarlet fever have been reported. Those communities reporting ten or more cases are as follows: Los Angeles County 17, Los Angeles 25.

Whooping Cough

300 cases of whooping cough have been reported. Those communities reporting ten or more cases are as follows: Oakland 13, Los Angeles County 28, Los Angeles 74, Needles 16, Coronado 11, San Diego 20, San Francisco 23.

Smallpox

16 cases of smallpox have been reported, as follows: Kern County 1, Los Angeles County 1, Los Angeles 6, Santa Monica 1, Santa Clara County 2, San Jose 1, Modesto 1, Ventura County 1, Fillmore 2.

Typhoid Fever

8 cases of typhoid fever have been reported, as follows: Oakland 1, Colusa 1, Kern County 2, Marin County 1, Sacramento County 2, Stockton 1.

Meningitis (Epidemic)

3 cases of epidemic meningitis have been reported, as follows: Oakland 1, Kern County 1, Ventura County 1.

Poliomyelitis

4 cases of poliomyelitis have been reported, as follows: Glendale 1, San Diego 2, San Francisco 1.

Undulant Fever

4 cases of undulant fever have been reported, as follows: Kern County 1, Riverside County 1, Santa Clara County 1, Stanislaus County 1.

Tetanus

3 cases of tetanus have been reported, as follows: Los Angeles County 1, Hollister 1, Tulare County 1.

Paratyphoid Fever (Beta)

One case of paratyphoid fever (Beta) from Modesto has been reported.

Food Poisoning

13 cases of food poisoning from Los Angeles County have been reported.

Tularemia

One case of tularemia from Fresno County has been reported.

CLAMS AND BEER

Because of the return of legal beer, there is considerable activity in the digging of clams. These shellfish are now advertised in many lunch places where beer is featured. This requires closer supervision over the digging of clams from San Francisco Bay areas, in order to make certain that no clams from quarantined areas reach the market.

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* From reports received on July 3d, 4th, and 5th, for the week ending July 1st.

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